



Test report No:
NIE: 61609REM.001

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-16 Edition) & ICES-003 Issue 6 (Updated 2017-04) & Subpart C (10-1-16 Edition)

(*) Identification of item tested	ECG measurement device
(*) Trademark	Firstbeat
(*) Model and /or type reference	Bodyguard 3
Other identification of the product	HW version: 0201 SW version: SW-R1 FCC ID: REVFBG30 IC: 10896A-FBG30
(*) Features	Bluetooth LE
Manufacturer	Firstbeat Technologies Oy Yliopistonkatu 28 A 40100, Jyväskylä, Finland
Test method requested, standard	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition) & ICES-003 Issue 6 (Updated 2017-04) & Subpart C (10-1-16 Edition)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC LAB Manager
Date of issue	2019-12-23
Report template No	FDT08_22

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Competences and guarantees

DEKRA Testing and Certification is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report, FCC designation number ES0004.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
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Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested" and "Derived model not tested").
2. The sample consists of a Device which is used as a data logger and data processor of ECG signal. Device is attached to chest for typical of 3-5 days measurement sessions. Collected data is sent to Cloud service for deeper analysis and feedback for the user.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples under test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
61609/001	ECG measurement device	Bodyguard 3	00024	2019/11/08

Test sample description

Ports..... :	Port name and description		Cable					
			Specified length [m]	Attached during test			Shielded	
	USB A to C			☒			☐	
	ECG electrode cable		0,4	☒			☐	
	N/A			☐			☐	
	N/A			☐			☐	
Supplementary information to the ports..... :	ECG electrode is connected to person's chest when in operation. USB is for charging and data connection and is NOT connected when attached to a person.							
Rated power supply	Voltage and Frequency		Reference poles					
			L1	L2	L3	N	PE	
	☐	AC:	☐	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐	☐
	☒	DC: Standard USB 5V power supply for charging (not provided with the product) Li-Ion 195 mAh (nominal) battery 3.0V-4.2V						
	☐	DC:						
Rated Power	1,8mW							
Clock frequencies	32768Hz and 32MHz							
Other parameters..... :	--							
Software version	SW-R1							
Hardware version..... :	0201							
Dimensions in cm (W x H x D)..... :	38mm x 55mm x 8mm							

Mounting position	☐	Table top equipment		
	☐	Wall/Ceiling mounted equipment		
	☐	Floor standing equipment		
	☐	Hand-held equipment		
	☒	Other: Attached in chest with ECG electrodes when in use		
Modules/parts	Module/parts of test item	Type	Manufacturer	
	Not provided data			
Accessories (not part of the test item)	Description	Type	Manufacturer	
	Not provided data			
Documents as provided by the applicant.....	Description	File name	Issue date	
	Not provided data			

Identification of the client

Firstbeat Technologies Oy
Yliopistonkatu 28 A
40100, Jyväskylä, Finland

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2019-11-28
Date (finish)	2019-12-04

Document history

Report number	Date	Description
61609REM.001	2019-12-23	First release

List of equipment used during the test

Control Number	Description	Model	Manufacturer	Next Calibration
2942	EMI TEST RECEIVER 20Hz-40GHz	ESU40	ROHDE AND SCHWARZ	2021-09-17
4452	ARTIFICIAL V-NETWORK	NNBM 8124-200A	SCHWARZBECK MESS-ELEKTRONIK	2020-08-16
4636	SONDA DE CORRIENTE, 10kHz – 500MHz	F55	FCC	2021-09-26
5641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2021-07-31
6121	PRE-AMPLIFIER G>40dB 10MHz-6GHz	BLNA 0160-01N	BONN ELEKTRONIK	---
6126	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2020-04-03
6129	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2020-04-03
6132	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2020-04-05
6205	THREE-PHASE ARTIFICIAL NETWORK 32A	PMM L3-32	NARDA	2020-09-26
6329	SHIELDED ROOM	---	FRANKONIA	---
6330	SHIELDED ROOM	---	FRANKONIA	---

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The test have been performed by the technical personnel: Antonio Ruiz, Antonio Manuel Sánchez & Carlos Haro.

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Emission Test		
Requirement – Test case	Verdict	Remark
Radiated emission. Electromagnetic field measure (30 KHz – 1000 MHz)	P	---
Radiated emission. Electromagnetic field measure (1 GHz – 12.75 GHz)	P	---
Radiated emission. Electromagnetic field measure (12.75 GHz – 26 GHz)	N/A	(1)
Continuous conducted emission (150 KHz – 30 MHz)	P	---
<u>Supplymentary information and remarks:</u>		
(1) Not applicable by the equipment internal work frequency.		

Appendix A: Test results

Appendix A Content

RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE..... 12

CONTINUOUS CONDUCTED EMISSION..... 17

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Bluetooth in RX mode. Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port) Auxiliary Laptop power supply: 115Vac.
OM#02	EUT ON. Bluetooth communication established. Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port) Auxiliary Laptop power supply: 115Vac.

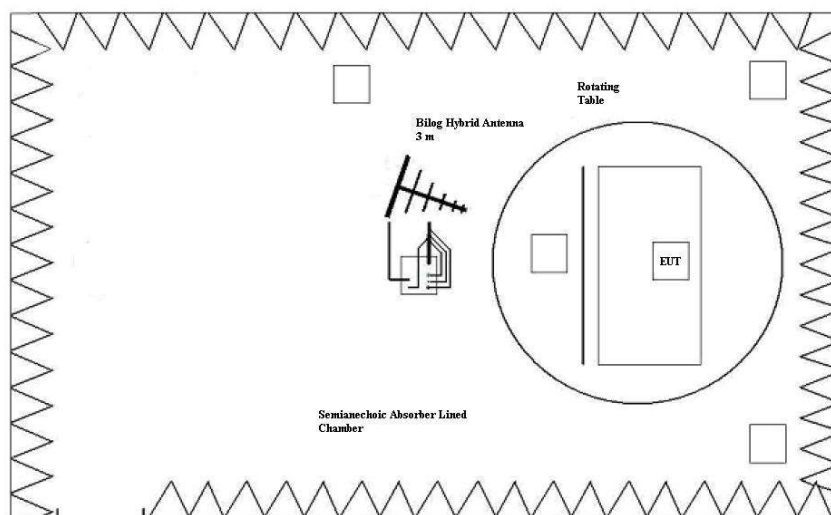
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017)

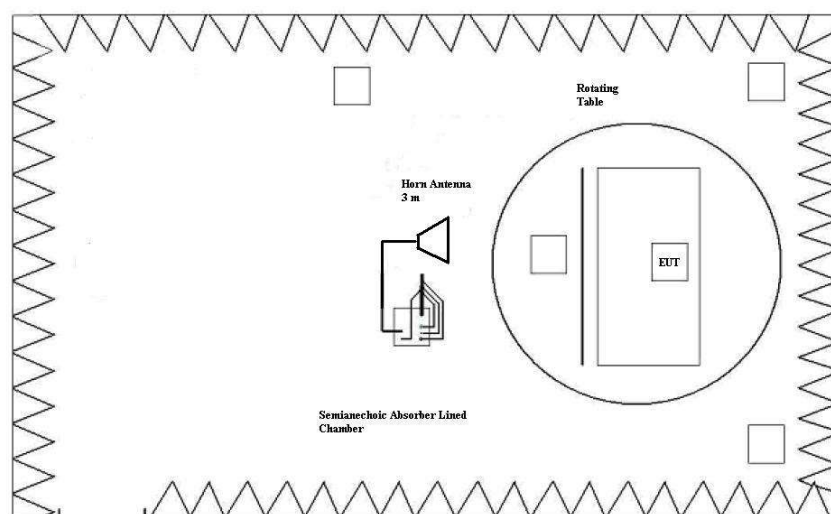
Limits of interference Class B

The applied limit for radiated emissions, 10 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017) in the frequency range 30 MHz to 26 GHz for class A equipment.

Frequency range (MHz)	QP Limit for 10 m	
	($\mu\text{V/m}$)	(dB $\mu\text{V/m}$)
30 to 88	90	39
88 to 216	150	43.5
216 to 960	210	46
Above 960	300	49.5



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

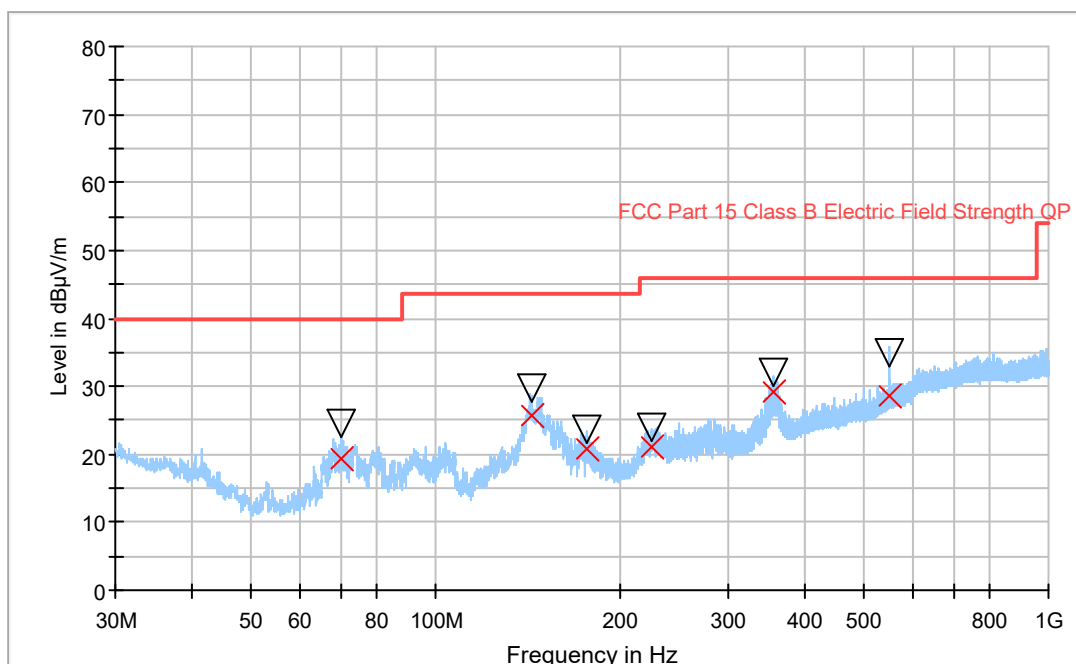
TESTED SAMPLE:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnnRRPP: CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Polarization.

CRmmnnRRPP	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz.	P
CR0101HR1_PH	Range: 1 GHz – 12.75 GHz. Horizontal Polarization.	P
CR0101HR1_PV	Range: 1 GHz – 12.75 GHz. Vertical Polarization.	P

Radiated Emission. CR0101LR

Project: 61609REM.001
Company: FIRSTBEAT TECHNOLOGIES OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth in RX mode. Transferring data via USB.
Equipment charging batteries. Power supply: 5Vdc. (By USB port)
Auxiliary Laptop power supply: 115Vac.

Full Spectrum



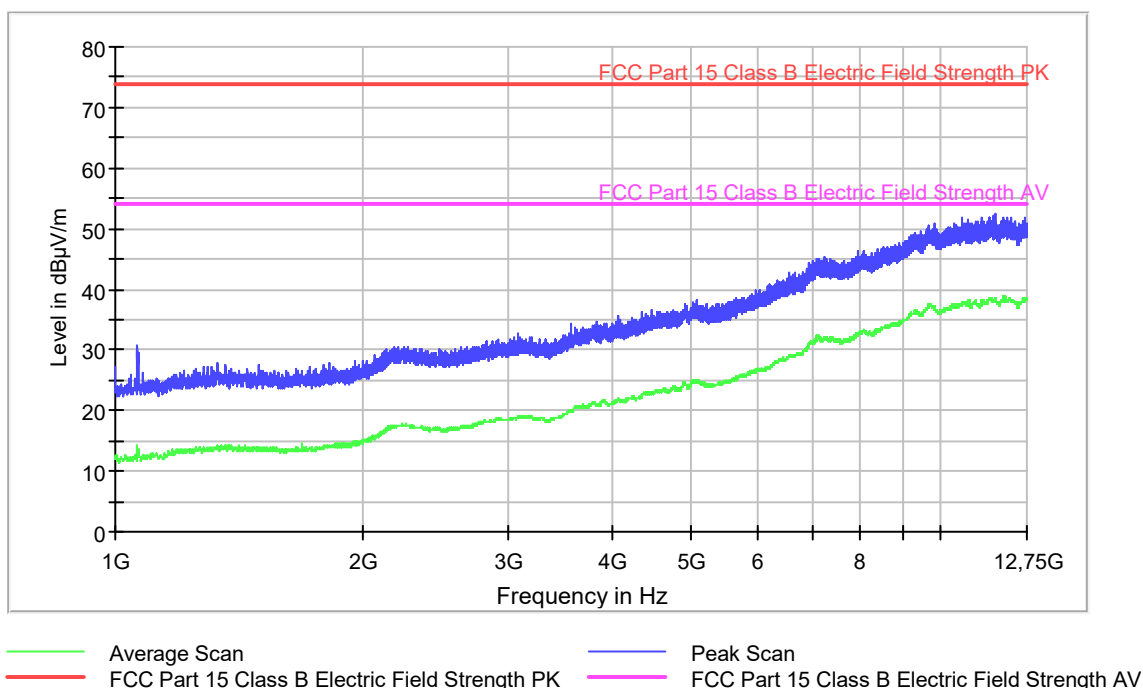
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
70.240000	19.38	24.57	149.0	V	59.0
143.039000	25.62	29.64	107.0	V	139.0
176.920000	20.88	23.54	107.0	V	-148.0
224.953000	21.00	24.10	169.0	V	-42.0
356.960000	29.16	31.98	153.0	V	106.0
549.295000	28.62	35.07	162.0	V	63.0

Radiated Emission. CR0101HR1_PH

Project: 61609REM.001
Company: FIRSTBEAT TECHNOLOGIES OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth in RX mode. Transferring data via USB.
Equipment charging batteries. Power supply: 5Vdc. (By USB port)
Auxiliary Laptop power supply: 115Vac. Horizontal Polarization

RE FCC Part 15 ClassB 1-12,75 GHz



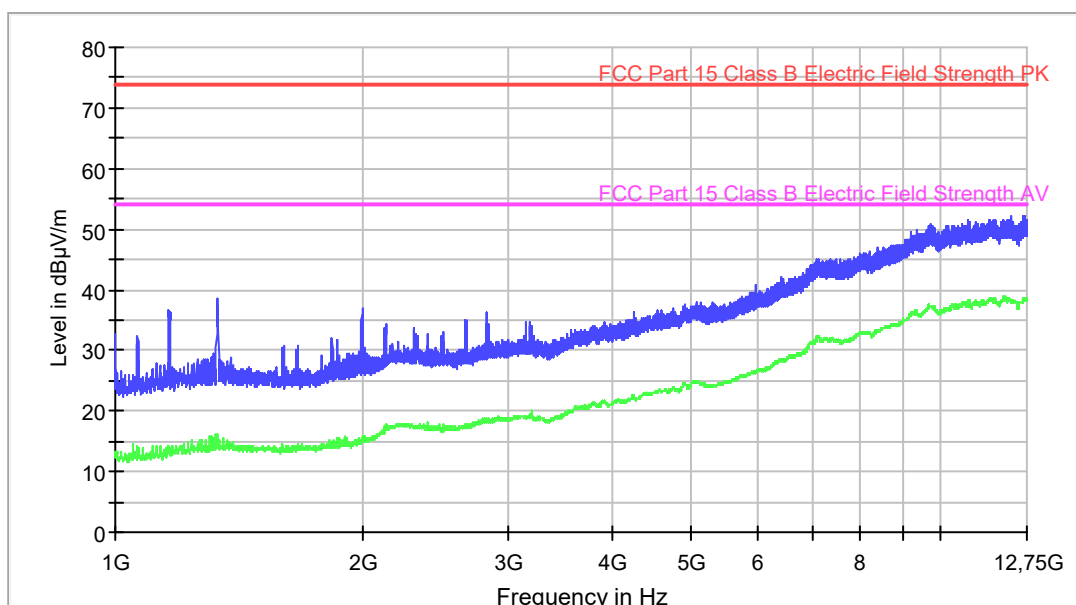
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBμV/m)	AVG CLRWR (dBμV/m)
1064.800000	30.7	12.9
3086.000000	32.7	18.9
4467.200000	36.4	22.9
5668.800000	38.5	25.4
6683.600000	42.9	29.1
7961.200000	46.3	32.7
9202.000000	48.6	35.9
9863.600000	50.7	36.9
11486.000000	51.9	38.4
11675.200000	52.3	38.3

Radiated Emission. CR0101HR1_PV

Project: 61609REM.001
Company: FIRSTBEAT TECHNOLOGIES OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth in RX mode. Transferring data via USB.
Equipment charging batteries. Power supply: 5Vdc. (By USB port)
Auxiliary Laptop power supply: 115Vac. Vertical Polarization

RE FCC Part 15 ClassB 1-12,75 GHz



— Average Scan — Peak Scan
— FCC Part 15 Class B Electric Field Strength PK — FCC Part 15 Class B Electric Field Strength AV

Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
1328.000000	38.7	16.2
2824.400000	36.3	18.4
4256.800000	36.4	22.2
5677.600000	38.3	25.5
6836.400000	42.9	29.6
7986.400000	45.8	32.7
9214.800000	49.2	35.8
9718.400000	51.0	37.3
11479.600000	51.4	38.5
12710.000000	52.3	38.4

CONTINUOUS CONDUCTED EMISSION

LIMITS:	Product standard :	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.107; ICES-003 Issue 6 (January 2016); Subpart C (10-1-16 Edition). Sec. 15.207
	Test standard :	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.107; ICES-003 Issue 6 (January 2016); Subpart C (10-1-16 Edition). Sec. 15.207

CLASS B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-16 Edition), Secs. 15.107 & ICES-003 Issue 6 (January 2016) & Subpart C (10-1-16 Edition). Sec. 15.207, in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0,15 to 0,5	66-56*	56-46*
0,5 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.

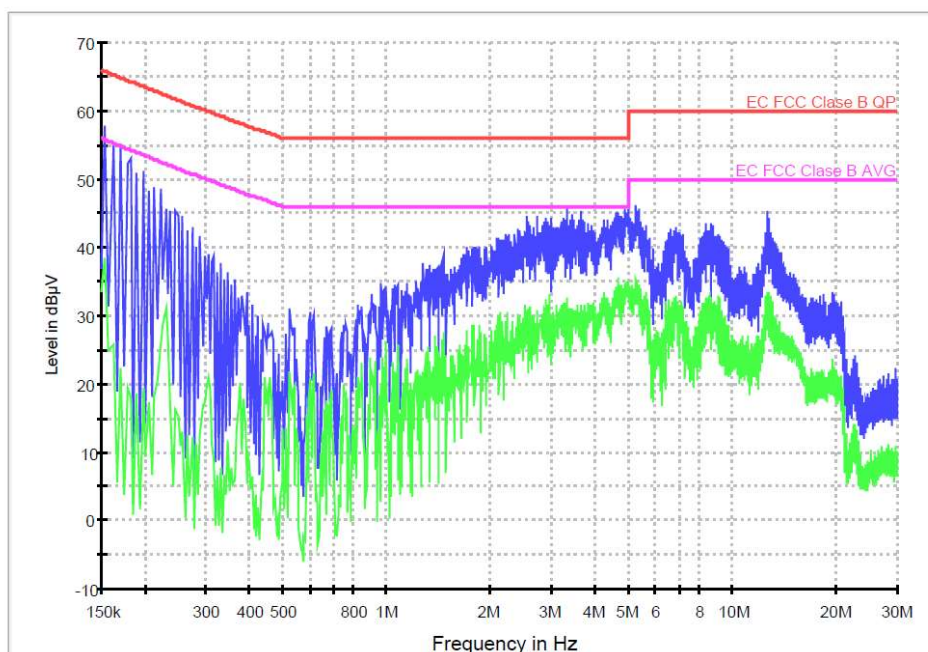
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01 & OM#02
TEST RESULTS:	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

CCmmnnhh	DESCRIPTION	RESULT
CC01010N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0101L1	Range: 150kHz – 30MHz. Phase wire noise.	P
CC01020N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0102L1	Range: 150kHz – 30MHz. Phase wire noise.	P

Conducted Emission. CC01010N

Project: 61609REM.001
Company: FIRSTBEAT TECHNOLOGIES OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth in RX mode. Transferring data via USB.
Equipment charging batteries. Power supply: 5Vdc. (By USB port)
Auxiliary Laptop power supply: 115Vac. Neutral Wire Noise

EC FCC Class B ESPI CC



— PeakScan — Average Scan — EC FCC Class B QP — EC FCC Class B AVG

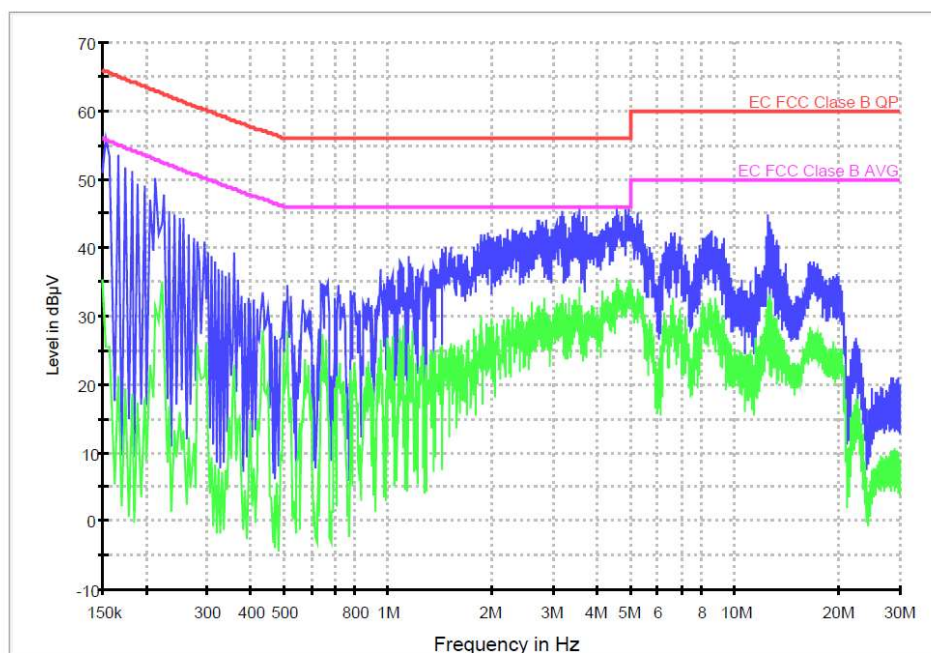
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.154000	57.8	38.4
0.258000	44.5	13.0
0.526000	31.1	21.7
1.222000	35.1	21.3
2.090000	41.4	28.7
3.342000	45.8	31.9
5.282000	46.1	35.4
8.426000	43.6	29.3
12.666000	45.3	32.7
19.446000	33.4	22.7

Conducted Emission. CC0101L1

Project: 61609REM.001
Company: FIRSTBEAT TECHNOLOGIES OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth in RX mode. Transferring data via USB.
Equipment charging batteries. Power supply: 5Vdc. (By USB port)
Auxiliary Laptop power supply: 115Vac. Phase Wire Noise

EC FCC Class B ESPI CC



— Peak Scan — Average Scan — EC FCC Class B QP — EC FCC Class B AVG

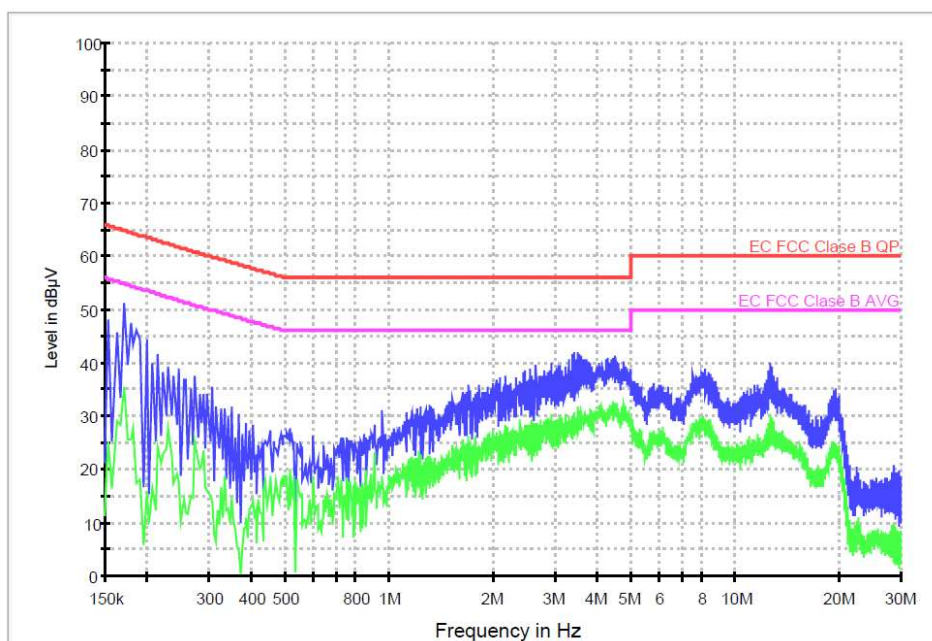
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.154000	55.9	25.6
0.258000	44.2	13.3
0.650000	34.8	27.2
1.146000	38.6	23.1
1.938000	42.2	28.5
3.586000	46.1	32.4
4.586000	46.1	35.5
8.574000	42.5	30.5
12.434000	44.8	32.3
17.726000	36.8	26.5

Conducted Emission. CC01020N

Project: 61609REM.001
Company: FIRSTBEAT TECHNOLOGIES OY
Sample: S/01
Operation mode: OM#02
Description: EUT ON. Bluetooth communication established. Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port)
Auxiliary Laptop power supply: 115Vac. Neutral Wire Noise

EC FCC Class B ESPI CC



— MaxPeak-ClearWrite-PK+ — Average-ClearWrite-AVG
— EC FCC Class B QP — EC FCC Class B AVG

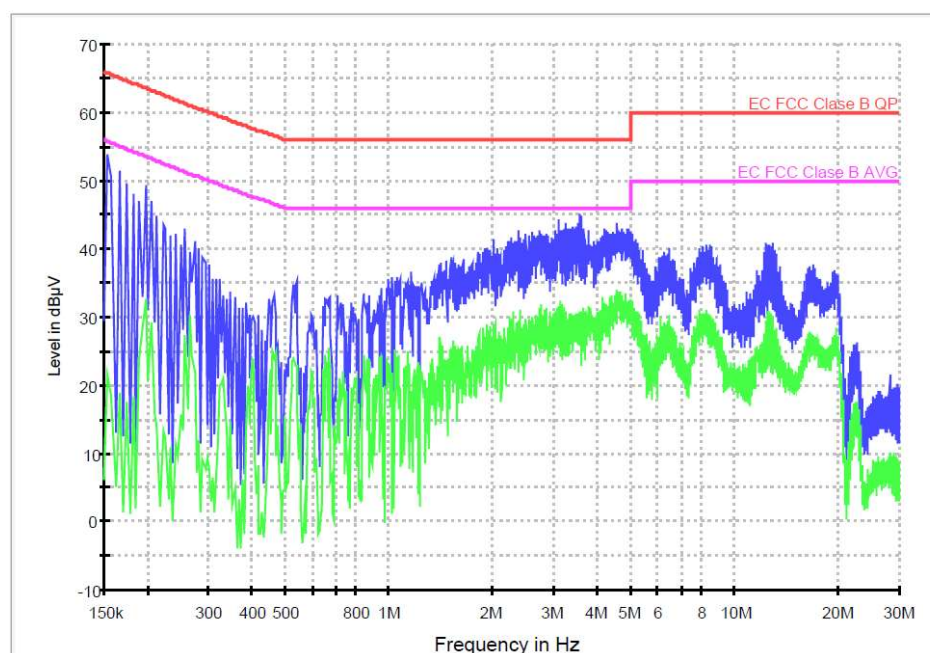
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.170000	51.4	35.6
0.274000	37.4	25.1
0.514000	27.7	20.0
1.230000	31.7	22.9
2.090000	37.1	26.1
3.482000	42.0	31.1
4.498000	41.2	32.5
8.122000	38.8	28.5
12.626000	39.8	29.0
19.534000	35.0	24.2

Conducted Emission. CC0102L1

Project: 61609REM.001
Company: FIRSTBEAT TECHNOLOGIES OY
Sample: S/01
Operation mode: OM#02
Description: EUT ON. Bluetooth communication established. Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port) Auxiliary Laptop power supply: 115Vac. Phase Wire Noise

EC FCC Class B ESPI CC



— Peak Scan — Average Scan — EC FCC Class B QP — EC FCC Class B AVG

Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV)	Average-ClearWrite (dBµV)
0.154000	53.8	21.6
0.258000	42.9	27.3
0.542000	35.2	22.7
1.166000	36.5	19.3
2.014000	41.3	29.0
3.590000	45.0	30.6
3.618000	44.7	30.9
8.466000	40.6	29.4
12.882000	40.8	29.0
19.414000	37.0	26.8